APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,591	12/18/2001	Hiroo Ohmori	217531US2	6176

			EXAMINER
22850	7590	03/09/2005	AGHDAM, FRESHTEH N

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
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ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _18 December 2001_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-12_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _2_ is/are allowed.

6)☒ Claim(s) _1,9,11 and 12_ is/are rejected.

7)☒ Claim(s) _3-8 and 10_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1, 2, 10, and 12 are objected to because of the following informalities:

As to claim 1, the word "method" after "adaptive equalization" should be removed to prevent the indefinite language on line 1.

As to claim 2, "the" prior to "tap coefficient G(n)" should be replaced by an "a" to over come the lack of antecedent basis on line 23.

As to claim 2, the word "approximated" should be replaced by "approximation" on line 4, page 32.

As to claim 2, the expression "generate a replica" should be explained further to over come the indefiniteness of the cited claim on line 9, page 32.

As to claim 2, "a" should be replaced by "the" as not to be indefinite on line 15, page 32.

As to claim 10, the expression "a replica signal" should be explained further to over come the indefiniteness of the cited claim on line 22, page 38.

As to claim 10, the expression "concerned to zero" is vague and should be replaced on line 25, page 38.

As to claim 12, the word "sad" should be replaced by "said" on line 12.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Namekata (5,673,294), and further in view of Nagayasu et al (6,269,124).

As to claims 1 and 9, Namekata teaches an adaptive equalizer comprising

calculation of the impulse response transmission path at blocks 115 and 116 based on

a received signal {rk} and a known signal sequence {sk} via switch 111, determination of

coefficient taps 124-129 of the linear filter16 corresponding to the impulse response

transmission path estimation wherein the impulse response transmission path

estimation is responsive to the received signal {rk} and the known signal {sk}, linear

filtering the received signal with the tap coefficients 124-129 at block 16 (Fig. 1; Col. 11,

Lines 30-67; Col. 12, Lines 30-35). One of ordinary skill in the art would clearly

recognize that it is obvious to use a type of memory to store the estimated impulse

response value in a memory. Namekata is silent about calculating a soft decision value

from the result of the linear filtering of the information signal of the received signal

following at least said known signal and said stored estimated impulse response value.

Nagayasu et al, in the same field of endeavor, teach the soft decision circuit 33 that

outputs the soft decision data y(m,n) responsive to the result of the estimation error

calculator (Fig. 5) and estimated channel impulse response g(0)-g(L). Therefore, it

would have been obvious to one of ordinary skill in the art to combine the teaching of

Nagayasu et al with Namekata in order to decrease the number of different bits between the pseudo transmission signals and the received signals (Abstract).

As to claim 11, Namekata teaches a path decision part for determining from the estimated impulse response value the power of the tap coefficients and comparing the received power of the corresponding path with a predetermined power path Pth to determine and select the tap coefficients which their power values are greater than the predetermined power path and based on the selection of the tap coefficients generating the estimated received signal 815 (Fig. 8; Fig. 10; Col. 15, Lines 27-29 and 57-67). One of ordinary skill in the art would clearly recognize that it is obvious to store the selected power paths and tap coefficients in a memory. Namekata is silent about calculating a soft decision value from the result of the linear filtering of the information signal of the received signal following at least said known signal and said stored estimated impulse response value. Nagayasu et al, in the same field of endeavor, teach the soft decision circuit 33 that outputs the soft decision data $y(m,n)$ responsive to the result of the estimation error calculator (Fig. 5) and estimated channel impulse response $g(0)-g(L)$. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Nagayasu et al with Namekata in order to shorten the tap concerning operation time.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Namekata and Nagayasu et al, further in view of Gatherer (US Patent 5,461,640).

As to claim 12, Namekata and Nagayasu et al teach all the subject matters as cited in claim 11. Namekata teaches a replica generating linear filter for generating a

replica signal of the received signal by linear filtering a likelihood with an estimated

impulse response value selection (the effective path) as recited in claim 11, a subtractor

17 to generate an error signal between the received signal 12 and the replica value 19

corresponding to the effective path, calculation of the tap coefficients of the linear filter

from the estimated impulse response value vectors corresponding to the effective path.

Nagayasu et al teach a soft decision circuit to calculate a soft decision value

corresponding to the impulse response value and calculation of a hard decision value

from a soft decision value by a maximum likelihood sequence estimator (Fig. 18; Col. 2,

Lines 18-20; Col. 8, Lines 38-45). One of ordinary skill in the art would clearly recognize

that use of memory to store the difference signal is obvious in the art since the equalizer

is adaptive it includes different rounds. Namekata and Nagayasu et al are silent about

calculating the tap coefficients of the estimated impulse response value corresponding

to the effective path through the use of a Matrix Inversion Lemma. Gatherer, in the

same field of endeavor, teaches using a matrix inversion lemma. Therefore, it would

have been obvious to one of ordinary skill in the art to combine the teaching of Gatherer

with Namekata and Nagayasu et al in order to lower the computational complexity (Col.

6, Lines 30-32).

Allowable Subject Matter

Claim 2 is allowed.

As to claim 2, the prior art of record fails to teach the limitations cited in the claim.

Claims 3-8 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claims 3-8 and 10, the prior art of record fails to teach the limitations cited in the claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Igarashi (US Patent 5,920,599) and Rademacher (US Patent 6,570,918).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Freshteh N. Aghdam whose telephone number is (571) 272-6037. The examiner can normally be reached on Monday through Friday 9:00-5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Freshteh Aghdam

March 4, 2005

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER

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